



Universiteit  
Leiden

The Netherlands

## **Rotator cuff degeneration in the rheumatoid shoulder : 'the issue is soft tissue'**

Sande, M.A.J. van de

### **Citation**

Sande, M. A. J. van de. (2008, February 14). *Rotator cuff degeneration in the rheumatoid shoulder : 'the issue is soft tissue'*. Retrieved from <https://hdl.handle.net/1887/12603>

Version: Corrected Publisher's Version

License: [Licence agreement concerning inclusion of doctoral thesis in the Institutional Repository of the University of Leiden](#)

Downloaded from: <https://hdl.handle.net/1887/12603>

**Note:** To cite this publication please use the final published version (if applicable).

# Rotator Cuff Degeneration in the Rheumatoid Shoulder

*The issue is soft tissue*

Research performed at the Leiden University Medical Center was financially supported by the Dutch Arthritis Association.

Further support for the preparation of this Thesis was received from:

AnnaFonds  
Dutch Arthritis Association  
Nederlandse Orthopaedische Vereniging (NOV)  
Nederlandse vereniging voor Arthroscopie (NVA)

Bauerfeind BV	Schering-Plough BV
BBraun BV	Somas BV
Biomet BV	Smith & Nephew BV
DePuy/Mitec J&J BV	Stryker BV
Endocare BV	Synthes BV
Implantcast BV	Tornier BV
KCI Medical BV	Toshiba Medical BV
Mathys Orthopaedics BV	Verweij Printing BV
Oldelft BV	Zimmer BV
Plus Orthopaedics BV	

I would like to gratefully acknowledge the support of these organisations.

Michiel Adrianus Josephus van de Sande

## ROTATOR CUFF DEGENERATION IN THE RHEUMATOID SHOULDER

PhD Thesis, Leiden University Medical Center, Leiden, The Netherlands

© Copyright 2008 M.A.J. van de Sande, Haarlem, The Netherlands  
All rights are reserved. No part of this thesis may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, without prior written permission of the authors.

Layout Verweij Printing, Mijdrecht, The Netherlands  
Coverdesign M.A.J. van de Sande  
Printed by Verweij Printing, Mijdrecht, The Netherlands  
ISBN 978-90-9022684-2

# Rotator Cuff Degeneration in the Rheumatoid Shoulder

'The issue is soft tissue'

## ACADEMISCH PROEFSCHRIFT

ter verkrijging van de graad van Doctor  
aan de Universiteit van Leiden,  
op gezag van Rector Magnificus prof. mr. P.F. van der Heijden,  
volgens besluit van het College voor Promoties  
te verdedigen op

donderdag 14 februari 2008  
klokke 15.00 uur

door

Michiel Adrianus Josephus van de Sande

Geboren te Vlijmen in 1976

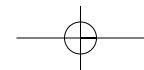
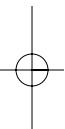
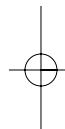
## Promotiecommissie

Promotor: Prof. dr. P.M. Rozing

Co-promotores: Dr. Ir. J.H. de Groot  
Dr. B.C. Stoel

Referenten: Prof. dr. R.G. Pöll (VUmc Amsterdam)  
I. Watt

Overige Leden: Dr. B.J. Burger (MCA Alkmaar)  
Prof. dr. T.W.J. Huizinga  
Prof. dr. R.G.H.H. Nelissen



*Voor mijn Ouders, Marit en Kasper*

## Contents

### CHAPTER ONE

#### General introduction

08

### CHAPTER TWO

#### Shoulder arthroplasty and rotator cuff surgery: a search for prognostic factors in shoulder surgery

- 2.1 Indications, complications and results of shoulder arthroplasty. 19  
*M.A.J. van de Sande, R Brand, P.M. Rozing*  
*Scan J Rheumatology 2006; 35:426-436*
- 2.2 Modular total shoulder system with short stem. 32  
A prospective clinical and radiological analysis.  
*M.A.J. van de Sande, P.M. Rozing*  
*Int Orthopaedics 2004; 28:115-8.*
- 2.3 Functional and biomechanical assessment of Teres Majo tendon transfer as primary treatment of a massive rotator cuff tear. 39  
*M.A.J. van de Sande, J.H. de Groot, P.M. Rozing*  
*Surgery of the Shoulder and Elbow. An International Perspective; AAOS 2006; Chap 6:35-41 ISBN 0-89203-361-4*

### CHAPTER THREE

#### New methods in clinical and radiological assessment of the rotator cuff muscles

- 3.1 Quantitative assessment of Fatty Degeneration in rotator cuff muscles determined with computed tomography. 48  
*M.A.J. van de Sande, B.C. Stoel, W.R. Obermann , J.G.S. Tjong a Lieng , P.M. Rozing*  
*Invest Radiology 2005; 40:313-9*
- 3.2 Proximal Migration Can Be Measured Accurately on Standardized Anteroposterior Radiographs. 61  
*M.A.J. van de Sande, P.M. Rozing*  
*Clin Orthop Relat Res 2006; 451:73-9*
- 3.3 Comparison between tri-pod and skin-fixed recording of scapular motion. 69  
*C.G.M. Meskers, M.A.J. van de Sande, J.H. de Groot*  
*J Biomech 2007; 40:941-6.*

**CHAPTER FOUR**  
**Clinical implementation**

- Subacromial space measurement: A reliable screening method  
indicating fatty degeneration in patients with rheumatoid arthritis. 76  
*M.A.J. van de Sande, B.C. Stoel, P.M. Ruzing*  
*Clin Orthop Relat Res. 2006; 443:260-5*

**CHAPTER FIVE**  
**Fatty degeneration of the rotator cuff; Clinical implications related to pain, function and force.**

- Clinical implications of rotator cuff degeneration in the rheumatoid shoulder 88  
*M.A.J. van de Sande, J.H. De Groot, P.M. Ruzing*  
*Arthritis Care & Research 2008*

**CHAPTER SIX**  
**Summary & General discussion**

- Summary & Discussion 104  
Samenvatting & Discussie 117

**CHAPTER SEVEN**

- References 127  
Bibliography 137  
Curriculum Vitae 139